Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the

application.

Listing of Claims:

Claim 1 (currently amended): A method of augmenting a tomographic projection image

of a patient, the method comprising the steps of:

obtaining a first sinogram data set from a patient;

~~reconstruct~~ reconstructing the first sinogram data set into a first image;

aligning the first image to a second image to obtain an aligned image, so that optimal

registration between the first and second image is obtained;

reprojecting the aligned image into a ~~third~~ reprojected sinogram data set;

extracting data from the ~~third~~ reprojected sinogram data set that is not available in the

first sinogram data set;

augmenting the first sinogram data set with the extracted data from the ~~previous step~~

reprojected sinogram data set to obtain an augmented sinogram data set; and

reconstructing the augmented sinogram data set into a third image.

Claim 2 (currently amended): A method of augmenting a tomographic projection image

of a patient, the method comprising the steps of:

converting a limited data sinogram to a limited ~~data~~ image;

fusing the limited ~~data~~ image to a complete image to obtain a transformed complete

image;

reprojecting a sinogram ~~for~~ data set from the transformed complete image;

augmenting the limited data sinogram with additional data obtained from the reprojected

sinogram ~~for~~ data set from the transformed complete image; and

converting the augmented limited data sinogram ~~to~~ into an augmented image.

Claim 3 (new): The method according to claim 2 wherein the step of fusing comprises

the steps of extracting certain features from the limited image and the complete image and

registering the features into the transformed complete image.

Claim 4 (new): The method according to claim 2 wherein the step of fusing is performed

manually.

Claim 5 (new): The method according to claim 2 wherein the step of fusing is performed

automatically.

Claim 6 (new): The method according to claim 2 wherein the step of fusing is performed

using geometric features, gradient methods or voxel-similarity techniques.

Claim 7 (new): The method according to claim 2 wherein the limited data sinogram, the

reprojected sinogram and the augmented limited data sinogram is represented by a data matrix

wherein each row represents an angle and each column represents a distance.

Claim 8 (new): The method according to claim 6 further comprising the steps of

comparing the data matrix of the reprojected sinogram is to the data matrix for the limited data

sinogram and determining what data is missing from the limited data sinogram.

Claim 9 (new): The method according to claim 2 further comprising the steps of using the image converted from the limited data sinogram for one of the following: patient setup, dose registration, delivery verification, deformable patient registration, and deformable dose registration.

Claim 10 (new): The method according to claim 1 wherein the step of aligning comprises the steps of extracting certain features from the first image and the second image and registering the features.

Claim 11 (new): The method according to claim 1 wherein the step of aligning comprises using common radiotherapy patient setup protocols.

Claim 12 (new): The method according to claim 1 wherein the first sinogram data set, the reprojected sinogram data set and the augmented sinogram data set are represented by a data matrix wherein each row represents an angle and each column represents distance.

Claim 13 (new): The method according to claim 1 further including step of using the third image for one of the following: patient setup, contouring, dose registration, delivery verification, deformable patient registration, and deformable dose registration.

Claim 14 (new): A method of reconstructing a limited data image from a complete data image, the method comprising the steps of:

obtaining a first sinogram data set from a patient;

reconstructing the first sinogram data set into a first image;

obtaining a second image from the patient;

reconstructing the second sinogram data set into a second image;

fusing the first image to the second image;

realigning the second image to the first image to obtain an aligned image;

reprojecting the aligned image into a reprojected sinogram data set;

merging the first sinogram data set by extracting data from the reprojected sinogram data

set that is not available in the first sinogram data set to obtain an augmented sinogram data set;

and

reconstructing the augmented sinogram data set into a fusion-aligned reprojection image.

Claim 15 (new): The method according to claim 14 wherein the first sinogram data set

contains limited data.

Claim 16 (new): The method according to claim 14 wherein the second sinogram data

set contains complete data.

Claim 17 (new): The method according to claim 14 wherein the second image contains

limited data, but is less-limited or limited in a different manner than the first sinogram data set

such that the first sinogram can be augmented from a second sinogram or the reprojected

sinogram.

Claim 18 (new): The method according to claim 14 wherein the first image is realigned

to the second image, reprojected into a reprojected sinogram data set, and extracting data from

the reprojected sinogram data set to augment data into the first or second sinogram data set to

obtain an augmented sinogram data set.

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Claim 19 (new): A method of augmenting a tomographic projection image of a patient, the method comprising the steps of:

obtaining a first sinogram data set from a patient;

obtaining a second sinogram data set from the patient;

fusing the first sinogram data set to the second sinogram data set to obtain an aligned sinogram data set, so that optimal registration between the first and second sinogram data sets is obtained;

merging the first sinogram data set with the aligned sinogram data set by extracting data from the aligned sinogram data set that is not available in the first sinogram data set to obtain an augmented sinogram data set; and

reconstructing the augmented sinogram data set into a fusion-aligned reprojection image.